

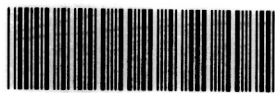
GET MORE FROM THE ATARI



IAN SINCLAIR

TP 31
S19

8563136



E8563136

Get More From The Atari

Ian Sinclair



GRANADA

London Toronto Sydney New York



Granada Technical Books
Granada Publishing Ltd
8 Grafton Street, London W1X 3LA

First published in Great Britain by
Granada Publishing 1983

Copyright © Ian Sinclair 1983

British Library Cataloguing in Publication Data
Sinclair, Ian R.

Get more from the Atari.

1. Atari computer

I. Title

001.64'04 QA76.8.A82

ISBN 0 246 12149 1

Typeset by V & M Graphics Ltd, Aylesbury, Bucks
Printed in Great Britain

All rights reserved. No part of this publication may be reproduced,
stored in a retrieval system or transmitted in any form, or by any
means, electronic, mechanical, photocopying, recording or otherwise,
without the prior permission of the publishers.

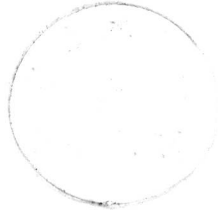
Preface

The Atari 400 and 800 models are now well-established and respected personal computers. Recent price cuts, and the provision of 48K of memory on all the 800 models have made these well-designed computers very much more competitive in the UK. This has highlighted the need for a comprehensive guide for the beginner to Atari programming. When the Atari models first appeared, the BASIC language cartridge which enabled the user to program the machine for himself/herself was sold as an extra. Because of the vast array of software which could be bought for the Atari models, there was little incentive for most owners to write their own programs. In addition, some of the most fascinating actions of the computer were not even hinted at in the manual.

This book is aimed at the beginner who has just acquired an Atari 400 or 800, but it should be of considerable service to the established owner of an Atari who has never tried programming. Programming for both models is identical, and the main differences between the 400 and the 800 are the keyboards, and the provision of an extra cartridge slot in the 800. Everything in this book, therefore, refers equally to both the 400 and the 800 computers. I am sure that the text and examples here will provide a welcome source of information for the beginner. I hope also that the more seasoned user will find much of interest, and perhaps a few welcome surprises in these pages.

Ian Sinclair

Contents



<i>Preface</i>	vii
1 Setting Up The Machine	1
2 Words On The Screen	13
3 A Bit Of Variation	23
4 Repetitions And Decisions	36
5 String Up Your Programs	51
6 Filing And Planning	65
7 The Coarser Characters	80
8 More Resolution	98
9 Sounding Out The Atari	124
10 Odds And Ends	136
<i>Appendix A: SAVE and LOAD Problems</i>	141
<i>Appendix B: Useful Addresses</i>	143
<i>Index</i>	145

Chapter One

Setting Up The Machine

By the time that you read this, you will have found that the Atari is a very solidly constructed machine, with a strong diecast chassis, and certainly no lightweight chunk of plastic. It comes much better prepared for service than most other machines, so that you can get it going for you very quickly. A computer is a more complicated device than a kettle or a toaster, however, and though the mains plug is already connected to your Atari, computing is not just a matter of plugging in and switching on.

First you must find a space large enough to take the Atari, along with everything you are likely to use with it. That will include a TV receiver and, almost certainly, the Atari program recorder (a form of cassette recorder). Later you may want to add disk drives, a printer and other goodies, so that space may be important. The only way I can manage to have several computers in one room is by using specially made stands, and the type made by Selmor (Fig. 1.1) is the best I have come across. If you are not quite at that stage yet, then make sure that you have a good-sized table or desk to work on.

With that hurdle over, you are almost ready to work some Atari wizardry, but you need the use of a TV receiver. A computer is a device which is arranged so as to send signals to a TV receiver, and unless you connect a TV receiver to the Atari you won't be able to see what the Atari is doing. It will still compute for you just as well, but you won't see what is going on.

Unlike most small computers, the Atari comes with its TV cable already attached and with an aerial plug at the end of the lead. You could, of course, simply plug this lead into the TV receiver, but a better option is to use the type of 2-to-1 adaptor that is illustrated in Fig. 1.2. This allows you to keep an aerial cable plugged in, and to connect or disconnect the Atari as you wish without disturbing the TV receiver. It's useful if you have to share a colour TV with the family. It also saves wear on the aerial connector of the TV receiver

2 Get More From The Atari

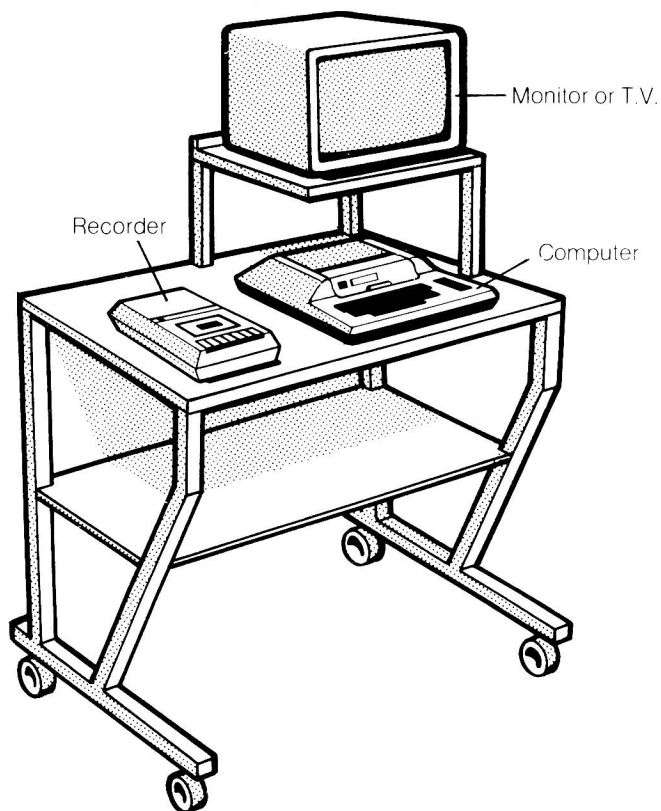


Fig. 1.1. The Selmor computer stand in use.

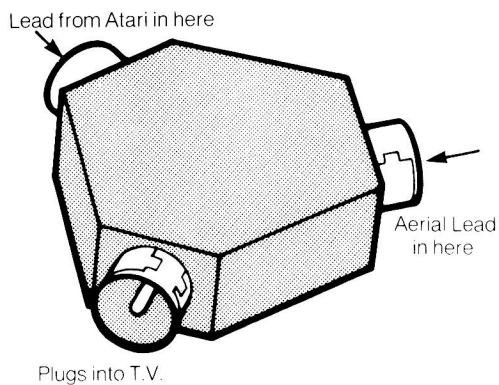


Fig. 1.2. A useful 2-to-1 TV adaptor. One of these is included with your Atari.

itself. This device is packed with your Atari, and its inclusion is typical of the way in which the Atari is made ready for you.

The TV that you use to display the Atari's signals need not be a colour receiver, not to start with at least. The skills of programming an Atari do not require you to see the results in colour until you come to the colour instructions of the Atari in Chapter 7. The signals which appear in colour on a colour TV will appear in shades of grey on a black/white TV so that you need not feel that you are missing anything essential if you have only a portable B/W TV available. Nevertheless, the colour signals that the Atari can produce are so outstandingly good that you should try to have a colour TV available when you come to Chapters 7 and 8 of this book.

The big switch-on

Now before you plug in everything in sight and switch on, it's a good idea to see how many mains sockets you have around. When you are in full control of your Atari you will need three mains sockets. Two of these will be for the Atari and the TV receiver, but you will need one more for the program recorder. Most houses have desperately few sockets fitted, so you will find it worth while to buy or make up an extension lead that consists of a three- or four-way socket strip with a cable and a plug (Fig. 1.3). This avoids a lot of what the famous advert calls 'spaghetti hanging out the back'. Don't rely on the old-fashioned type of three-way adaptor – they never produce really reliable contacts. The Atari has its own mains switch, but this does not switch the mains supply. The mains plug connects to a power-pack, which converts the high mains voltage into a low (and

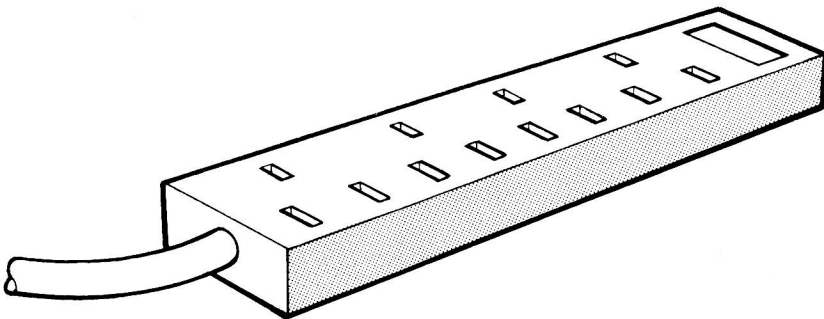


Fig. 1.3. A four-way socket strip which avoids the use of the old-style adaptors.

4 Get More From The Atari

safe) voltage supply for the Atari. This low voltage supply is taken along a lead which has a small tubular plug fitted to it. This plugs into the power input socket at the right-hand side of the Atari. When you switch off the Atari, using the switch at this right-hand side, you do not switch off the mains. It's always a good idea to pull out the mains plug after you have switched off at the machine. In addition, you should make sure that the power pack is resting in a well-ventilated place, because it will become warm while it is working.

Before you can start to do any serious work with programming your Atari, you will need to instal the BASIC cartridge, if this has not already been done by your dealer. At the top edge of the keyboard, you will see a small catch that is marked PULL OPEN. Pull it towards you to release the catch, and you can lift the flap which is just behind it. There are two slots under this flap. The BASIC cartridge plugs into the left-hand slot, with the title of the cartridge facing you (see Fig. 1.4). The next step, now, is to shut the

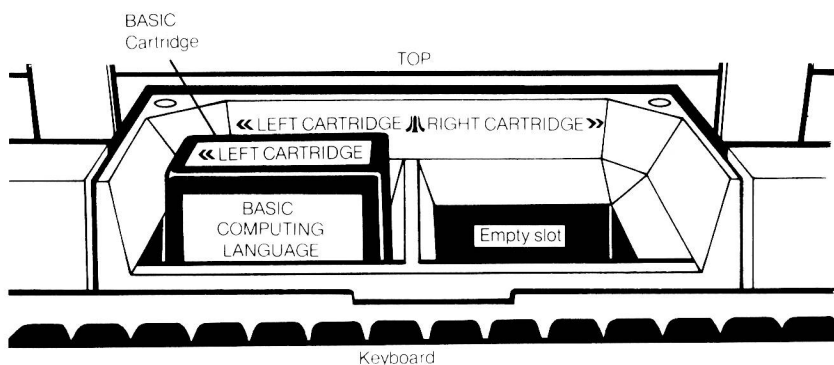


Fig. 1.4. Plugging in the BASIC cartridge. This is illustrated for the Model 800, in which the left-hand cartridge socket must be used.

flap again, and switch on the TV receiver and the Atari. The small built-in loudspeaker of the Atari remains silent as you switch the machine on. It's job is to deliver warning messages when something goes wrong. It doesn't, however, deliver the main sound effects. These are played through the loudspeaker of the TV so that you have full control over the volume.

An ordinary domestic TV is not ideal for viewing the Atari (or any other computer) signals. This is because the signals cannot be sent directly to the TV in the form that would give a clear picture. Instead, they have to be transmitted, using a miniature transmitter

that is called a *modulator*. This is because most TV receivers cannot be connected safely to anything except by the aerial lead. Very much clearer pictures can be obtained by using what is called a 'monitor'. This is a form of stripped-down TV which can't receive broadcast signals (no licence needed!), but which can be connected safely to the Atari, and to a few other types of computers, to show high quality pictures. If you are lucky enough to see a demonstration of Atari signals displayed on a colour monitor you will get some idea of how much is lost when a modulator and an ordinary colour TV has to be used. You can buy a special cable for fitting a monitor to your Atari if you are so fortunate as to have a monitor available.

The second point is that a TV receiver has to be tuned to the signal from the Atari. Unless you have been using a video cassette recorder, and the TV has a tuning button that is marked 'VCR' it's unlikely that you will be able to get the Atari tuning signal to appear on the screen of the TV simply by pressing tuning buttons. The next step, then, is to tune the TV to the Atari's signals. Plug in the mains plugs of the Atari and the TV, making sure that the small plug from the Atari power supply is firmly inserted into its socket. Switch on the TV and turn down the volume control so that you are not distracted by the noise. Switch on the Atari, using the rocker-switch at the right-hand side of the machine.

Figure 1.5 shows the three main methods that are used for tuning TV receivers in this country. The simplest type is the dial tuning system that is illustrated in Fig. 1.5(a). This is the type of tuning system that you find on black/white portables, and you only have to turn the dial to get the Atari's signal on the screen. If the dial is marked with numbers, then you should look for the signal somewhere between numbers 30 and 40. If the dial isn't marked, which is unusual, then start with the dial turned fully anticlockwise as far as it will go, and slowly turn it clockwise until you see the Atari signal appear. If you turn the volume control up slightly so that you can hear the rushing noise of the untuned receiver, you will hear things go quiet as the Atari signal appears. You may find that there is some reduction in the sound level as you tune to a local TV transmission, but you'll notice the difference. The Atari doesn't give you the sound of Coronation Street!

What you are looking for, if the Atari hasn't been touched since you switched it on, is the word **READY** on the screen. When you can see this word, turn the dial carefully, turning slightly in each direction until you find a setting in which the words are really clear. On a TV receiver, particularly a colour TV, the words may never be

6 Get More From The Atari

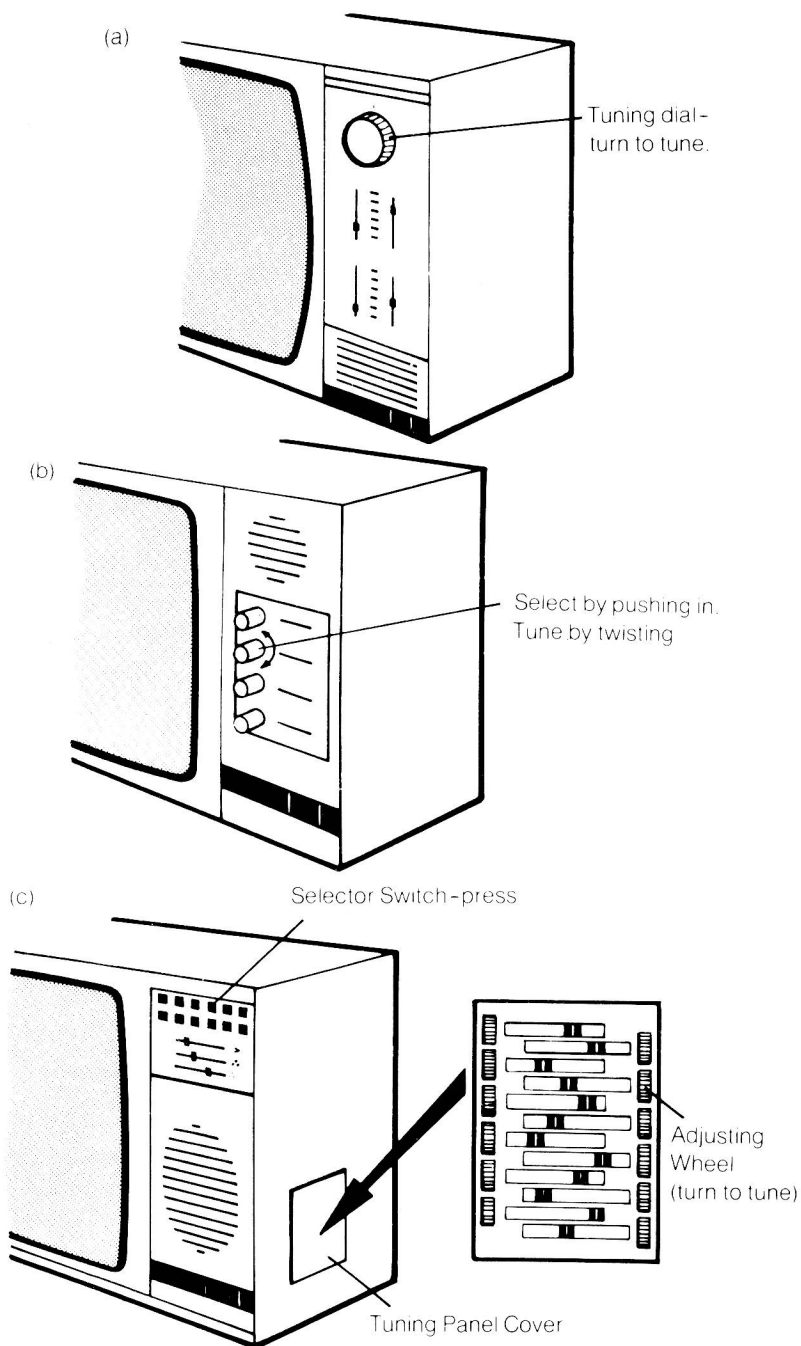


Fig. 1.5. TV tuning controls. (a) Single dial, as used on black and white portables, (b) four-button type, (c) the more modern touch-pad or miniature switch type.

particularly clear, but get them steady at least and as clear as possible. If you don't have the BASIC cartridge installed at this stage, all you'll see (on a colour receiver) is a blue background.

The older types of colour and B/W TV receivers used mechanical push-buttons (Fig. 1.5(b)) which engage with a loud clonk when you push them. There are usually four of these buttons, and you'll need to use a spare one which for most of us means the fourth one. Push this one in fully. Tuning is now carried out by rotating this button. Try rotating anticlockwise first of all, and don't be surprised by how many times you can turn the button before it comes to a stop. If you tune to the Atari's signal during this time, you'll see and hear the same signs – the message on the screen and the reduction in the noise from the loudspeaker. If you've turned the button all the way anticlockwise and not seen the tuning signal, then you'll have to turn it in the opposite direction, clockwise, until you do. If you can't find the Atari signal at any setting, check the TV using an aerial in case there is something wrong with the tuning of the TV.

Modern TV receivers are equipped with touch pads or very small push-buttons for selecting transmissions. These are used for selection only, not for tuning. The tuning is carried out by a set of miniature knobs or wheels that are located behind a panel which may be at the side or at the front of the receiver (Fig. 1.5(c)). The buttons or touch pads are usually numbered, and corresponding numbers are marked on the tuning wheels or knobs. Use the highest number available (usually 6 or 12), press the pad or button for this number, and then find the knob or wheel which also carries this number. Tuning is carried out by turning this knob or wheel. Once again, you are looking for a clear picture on the screen and silence from the loudspeaker. On this type of receiver, the picture is usually 'fine-tuned' automatically when you put the cover back on the tuning panel, so don't leave it off. If you do, the receiver's circuits that keep it in tune can't operate, and you will find that the tuning alters, so that you have to keep re-tuning. Figure 1.6 illustrates some of the faults that can be caused by mis-tuning.

The Atari attractions

Once you have achieved a tuned signal from your Atari, the business of mastering the Atari attractions can start. It's important to note that nothing that you can do by pressing keys on the keyboard can possibly damage the Atari – the worst you can do is to lose a



Fig. 1.6. Picture defects caused by faulty tuning.

program that was stored in the memory. You can, however, damage the Atari by spilling coffee all over it, dropping it, or connecting it up to other circuits while the power is switched on. Opening the cartridge cover will not cause damage, because the computer is automatically switched off when you do this. You will, however, lose any program that was stored in the computer when you open this hatch.

It's time now to look at the keyboard, because the keyboard is the way that you pass instructions to the Atari. If we ignore the keys at the left- and right-hand sides, most of the Atari keys look like typewriter keys. The arrangement of letters and numbers is the same as that of a typewriter and if you've ever used a typewriter, particularly an electric typewriter, then you should be able to find your way round the keyboard of the Atari pretty quickly.

There's one very noticeable difference, though. When you use a typewriter, pressing a letter key gives you a small letter (called *lower-case*), and pressing a letter key along with the SHIFT key produces a capital letter (called *upper-case*). On the Atari, you will get upper-case letters whether you have the SHIFT key pressed or not. This is because the instructions that you issue to the machine have to be typed in upper-case letters, so it's set up to give these letters unless you want to use lower-case. To change over to lower-case, you must press the CAPS/ LOWER key, which is above the SHIFT key on the right-hand side of the keyboard. After pressing this key, you will get lower-case letters normally, and capitals when you press the SHIFT

key as well, just like a typewriter. To return to normal computer-style capitals, press SHIFT and the CAPS/LOWER keys at the same time.

As well as the ordinary typewriter keys, there are a number of special keys which are not found on any typewriter. Among these are the keys which are marked ESC (Escape) and CTRL (Control). These are used in special ways that will be explained later. The ESC key is always used by pressing it, releasing it, and then pressing another key. The CTRL key is always used by being held down while another key is being pressed. Another important key is the BREAK key, at the top right-hand side of the keyboard. This is a 'panic button' which when pressed will return the control of the Atari to you if it appears to have 'locked up' and refuses to obey instructions. Pressing this key will not cause you to lose a program that is stored in the memory of the computer. The most important of these special keys, however, as far as we are concerned at the moment, is the key that is marked RETURN. This is in the position of the 'carriage return' key of an electric typewriter, but its action is not the same in all respects. Pressing the RETURN key is a signal to the computer that you have completed typing an instruction and that you now want the computer to obey it.

If you are accustomed to using an electric typewriter, you will have to change some of your habits as far as this key is concerned. During the use of a typewriter, you would press the 'carriage return' key each time you wanted to select a new line, with typing starting at the left-hand side of the new line. The RETURN key of the computer does rather more than this. If the material that you are typing into the Atari takes more than one line on the screen, the machine will automatically select the next screen line for you. The RETURN key must not be used for this purpose. The RETURN key is used only when you want the machine to carry out a command or store an instruction, not simply when you want to use a new line. It will always provide a new line for you, however, and select a position at the left-hand side. The position where a letter or other character will appear when you press a key is indicated by a flashing block on the screen. This flashing block is called the 'cursor', and it acts as a sort of signpost for you, as we'll see later.

Store it away

You can get a lot of enjoyment from a computer system that consists

only of the machine and a TV receiver. Each time that you switch the machine off, however, all the program and other information that has been stored in the memory of the computer will be lost. Since it might take several hours to enter a program into the machine by typing instructions on the keyboard, this waste just has to be avoided. We avoid the loss of programs by recording them on tape.

The computer has circuits which will convert the instructions of a program into musical tones, which can then be recorded on an ordinary cassette recorder. When these notes are replayed, another set of circuits will convert the signals back into the form of a program. In this way, the use of a cassette recorder allows you to record your programs on tape and to replay them. Before you tackle the rest of this book, then, it's important to check now that you can record and replay programs.

Some computers can make use of ordinary cassette recorders, but such machines were never designed for use with programs, and troubles with recorders are very common when such machines are used. The Atari requires its own special recorder. This is purpose-built for program recording, and you cannot use an ordinary unmodified recorder in its place. The program recorder requires another power pack, which is also fitted with a three-pin plug for mains supply, and a small plug for engaging into the power socket of the recorder.

Start work by switching everything off. Now find the cassette lead of the Atari. This is attached to the program recorder at one end, and has a large plug at the other end. The plug fits into a socket at the right-hand side of the Atari – it's marked 'PERIPHERAL'. Be careful how you push this plug in. It should fit only one way round, so don't force it.

Once you have made this connection, the program recorder is ready for use. The next thing that you have to sort out is a supply of blank cassettes. There's nothing wrong with using reputable brands of C90 length cassettes (ordinary 'ferric' tape, not the hi-fi CrO₂ type), but you'll find that the short lengths of tape that are sold as C5, C10 or C15 in computer shops and in most branches of W. H. Smith's, Boots, and Currys are much more useful.

Put a fresh cassette into the machine, with the I or A side uppermost. The first part of the cassette consists of a 'leader' which is plain, not recording, tape. This has to be wound on before you can record. Reset the counter of the program recorder to zero, and then fast-wind the cassette to a count of 5.

Now before you can make a recording to test the system, you need

```

10 REM
20 REM
30 REM
40 REM

```

Fig. 1.7. A program for testing the cassette recording and replaying actions.

a program to record, and this involves some typing. This is easy if you have just switched the Atari on, but if you have been pressing keys at random, then it's a good idea to switch off again, then on. This gets the machine cleared, and all ready for you to start.

Type the number 10 (1 and then 0), and then the word REM. Check that this looks correct, and then press the RETURN key. The effect of this is to place the instruction line 10 REM into the memory of the Atari. Now type the rest of the lines, as illustrated in Fig. 1.7, remembering to press the RETURN key after you have completed typing each line. The numbers are called 'line numbers', and they are there for two reasons. One is to remind the computer that this is a program; the other is to guide it, because the computer will normally carry out instructions in the same order as the line numbers.

Check that your program looks on the screen like the printed version in Fig. 1.7, and make sure that the recorder is ready. Now type CSAVE. The C stands for cassette, and CSAVE is the instruction to the computer meaning that you want to save (record) a program on a cassette. Now press RETURN, and you'll hear the built-in loudspeaker of the Atari buzz twice at you. Now start the recorder by pressing its PLAY and RECORD keys. Press them firmly so that they lock in place. Nothing will happen until you press RETURN once more, and you will then see the reels of the cassette turning. If you turn up the volume control of the TV receiver, you will hear the sounds that are being recorded. After a rather long time, the cursor of the Atari will reappear on the screen with a READY message. This lets you know that the program has been recorded, and you can press the STOP key of the recorder. The motor will have been stopped automatically, but it's not good for the recorder to leave the PLAY key depressed for long periods when the motor is not moving. That's all.

Now comes the crunch. You have to be sure that the recording was O.K. Wind back the tape again. Type NEW and press RETURN. This should have wiped your program from the memory. Now type LIST and press RETURN. Nothing should appear – LIST means put a list of the program instructions on the screen, and there shouldn't be any!

You can now load the instructions in from the tape. Type

CLOAD and press RETURN. The loudspeaker will honk at you again, once only. You can rewind the tape, if you forgot to do so earlier. Now press the PLAY key of the recorder and press the RETURN key of the computer again. The motor will start, and the program will be entered into the memory of the Atari again. Once more, the word READY will appear to tell you that the loading process has finished, and the motor of the program recorder will stop. Type LIST now, then press the RETURN key. You should see your program appear on the screen.

Once you can reliably save programs on tape, and re-load them, you can confidently start computing. When you have spent an hour or more typing a program on to the keyboard, it's good to know that a few minutes' more work will save your effort on tape so that you won't have to type it again. It's a remarkably foolproof system compared to the capers that other computer owners have to endure, and you should find no problems. If you cannot load or save programs, ask your Atari dealer to sort it all out for you – there's nothing that you can do for yourself. If you find that some programs do not record satisfactorily, but others do, then there's advice for you in Appendix A. For the moment, however, you should encounter no problems while you stick to simple programming.

One final point. If you leave your Atari switched on for a long time without typing anything on the keyboard, you will see the picture on the screen change colour at intervals. This is intentional. It reminds you that the machine is switched on, and it prevents possible marking of the TV screen due to displaying one unchanged colour for a long time. It's just another example of thoughtful Atari design.